

Headquarters U.S. Air Force

Integrity - Service - Excellence

Systems Lifecycle Integrity Management (SLIM)



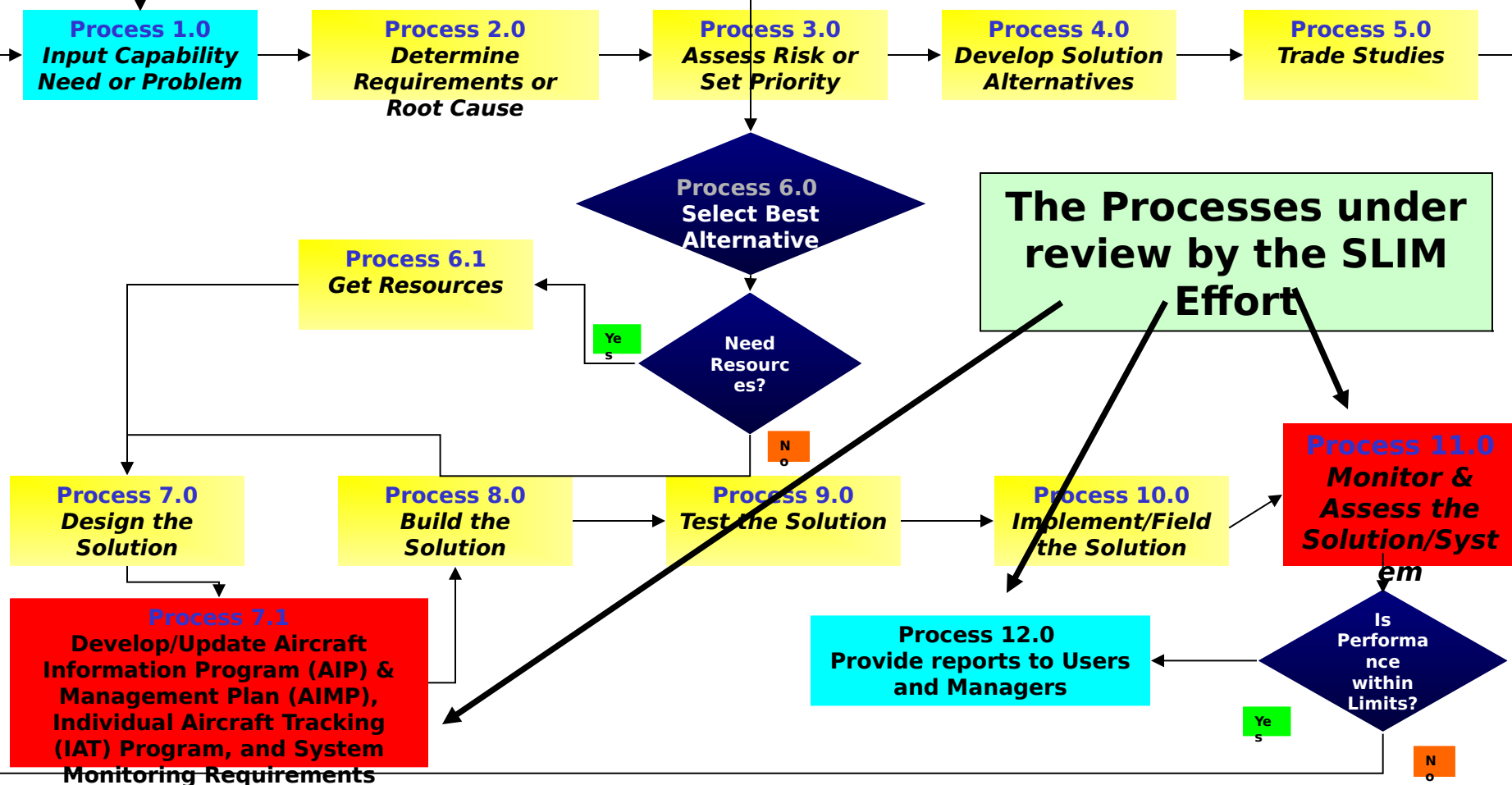
Mr. John McDonald
AF/A4ID



Systems Engineering

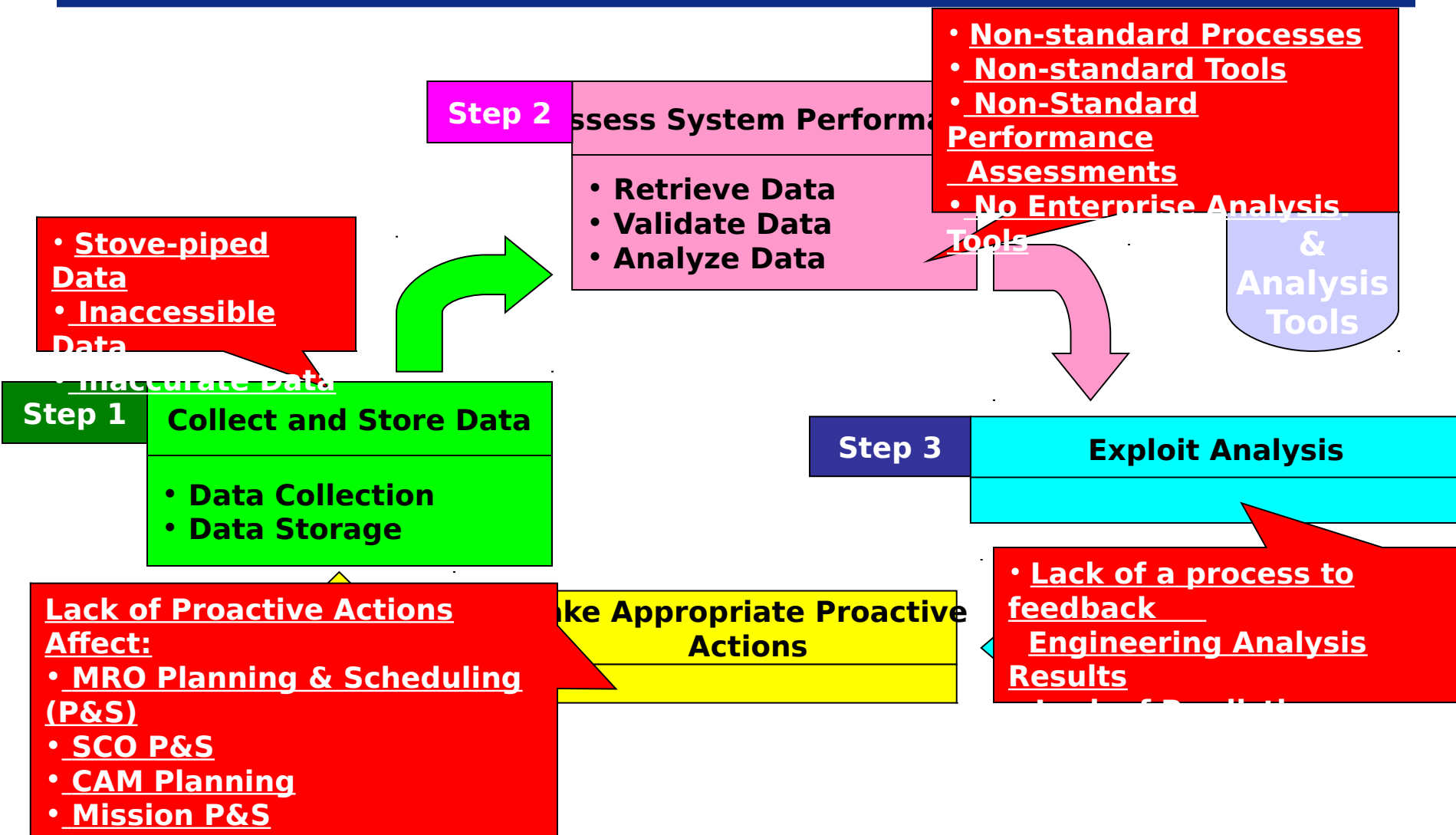
See Notes Section

Deficiency Reports (DR), Engineering Change Requests (ECR), Electronic Technical Assistance Requests (ETAR), Mishap Recommendations, Product Improvement Group Action Item (AI), Corrosion Prevention Advisory Board CPAB) AI, System Safety Group (SSG) AI, Service Bulletins, Airworthiness Advisories, GIDEP Reports, etc





Current State





SLIM Vision/ Mission Statement

Vision Statement

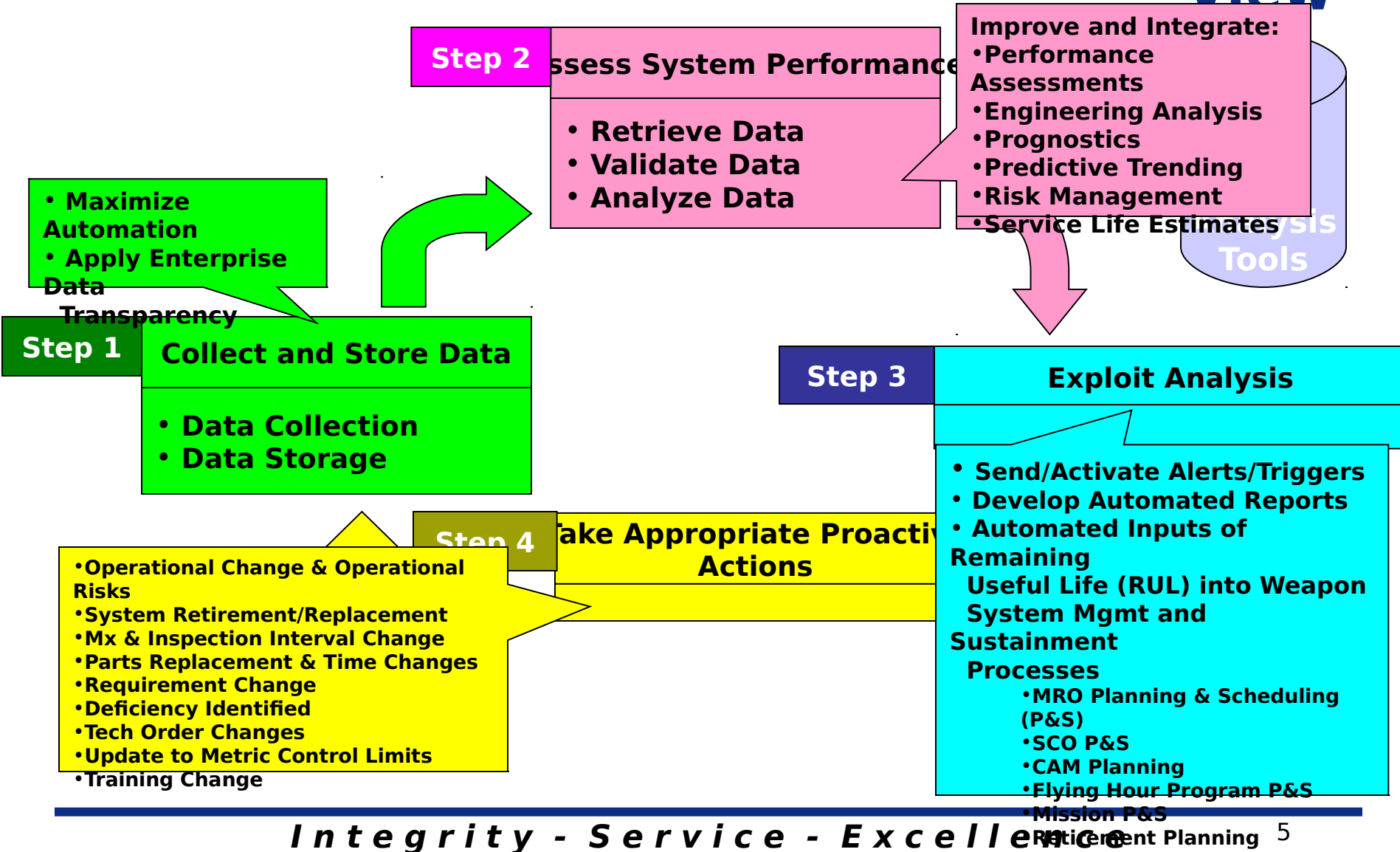
The proactive approach to managing fleet health

Mission Statement

Integrate WSIP, CBM+, RCM/MSG-3, RAM, MFOQA, EAVI, and AIP efforts. Standardize engineering processes/tools associated with improving system performance monitoring and assessment leading to proactive weapon system management and product improvement throughout the system lifecycle.



SLIM/ Monitor Weapon System Process View





Expected SLIM Benefits

- **Increased engineering process discipline, predictive tools, and information drive implementation of Condition Based Maintenance**
 - Increased application of advanced prognostics (CBM+ & WSIP)
 - Improved processes thru deployment of enterprise tools
- **Improved and automated feedback of analysis results into weapon system sustainment and product improvement processes**
- **Improved enterprise training--CBM+, RCM, RAM, AIP, WSIP, & MFOQA**
- **Identification of interdependencies with ECSS, PLM, LIMS-EV, RNT, OASD RIWG IPT, and D&SWS (OC2 & LCM) initiatives/efforts**

Goal: Improve system performance monitoring and assessment leading to increased proactive weapon system management.



Plan & Implement Fixes

■ Improved Data Access

- LIMS-EV Engineering/Technical and Fleet Viability Board Views (FY 09)
- CBM+ Research Environment (CBM+ RE) (FY10, depending on funding)
 - Enterprise federated data query and data mining capability
 - Successful Phase 1 demonstration and draft AV-1 completed
 - Data federated from EHM+DRC, ASIMIS, and GCSS-AF DS
- SLIM included with Logistics Community of Interest (COI)
 - SLIM data vocabulary, authoritative data, and data standards

Goal: Improve system performance monitoring and assessment leading to increased proactive weapon system management.



Plan & Implement Fixes (cont)

■ Enterprise Tools

- A&S Toolkit Checklists for SLIM and CBM+ (FY08)
 - LHA, ILA, and SEAM updates (FY09-10)
- SLIM Process Guide and Design Review Checklists (FY09)
- Improved Prognostics
 - EMLI, SIP, ESP, etc (ongoing AFRL & DARPA projects)
- Enterprise trending and statistical analysis capabilities
 - LIMS-EV and Collective Mind (FY 09)
- Increase use of DOD Reliability Information Analysis Center (RIAC) reliability tools, templates, and guides (ongoing)

Goal: Improve system performance monitoring and assessment leading to increased proactive weapon system management.



Plan & Implement Fixes (cont)

- Improved feedback of analysis results into sustainment processes (FY 09-10)
 - Remaining Useful Life (RUL), Probability of Failure (PoF), and Confidence Levels
 - MRO Planning & Scheduling (P&S), SCO P&S, CAM Planning, Flying Hour Program P&S, Mission P&S, Retirement Planning, etc
- Training courses: CBM+, RCM, RAM, AIP, WSIP, & MFOQA (TBD)
 - New AFIT courses developed using existing material from subject matter experts and material located at the OSD Reliability Information Analysis Center (RIAC) website to the utmost

Goal: Improve system performance monitoring and assessment leading to increased proactive weapon system management.



SLIM & ECSS Interdependencies

- **SLIM needs ECSS to provide as much enterprise maintenance data and usage data collection as possible**
- **SLIM needs ECSS to be able to cross reference Maintenance Data tracked by Work Unit Code (WUC) to Supply Data tracked by NSN**
- **SLIM needs ECSS to accept SLIM analysis results into planning, scheduling, and other sustainment processes**
 - **Remaining Useful Life (RUL), Probability of Failure (PoF), confidence levels, risks, & other analysis results**
 - **Supports planning and scheduling functions for MRO, APS, CAM, GLSC, GACP, AFFVESA, RNT, and possibly Mission Planning**
- **SLIM needs ECSS to identify serially tracked NSN “Bad Actors”**



SLIM & PLM Interdependencies

- **SLIM will feedback in-service performance data into PLM item attributes**
 - **MTBF, TOC, RUL, current configuration status, etc**
- **SLIM needs PLM to provide Integrated Weapon System Configuration Management Processes and Tools**
- **SLIM needs PLM to provide enterprise Integrated Electronic Technical Assistance Request (ETAR) capability**
- **SLIM needs PLM to provide an enterprise Failure Modes, Effects, & Criticality Analysis (FMECA) capability**
 - **Includes configuration management of FMECA throughout weapon system's lifecycle**



SLIM Schedule

Milestone/Project	Start	Finish	Percent Complete
SLIM Process RIE	Feb 07	Feb 08	100%
SLIM Process & Tools Survey	Nov 07	May 08	85%
SLIM Data Collection Survey	Feb 08	May 08	80%
SLIM 101 Brief	Feb 08	Apr 08	100%
Data Collection RIE	12 May 08	16 May 08	80%
Planning & Scheduling RIE	Oct 08	Oct 08	0%
LOGEA AV-1	Mar 08	Aug 08	40%
SLIM & ECSS Gap Analysis	Apr 08	Dec 08	5%
LIMS-EV Engineer & Technical View	Apr 08	Dec 08	5%
AFLMA SLIM DE AOA & BCS	Apr 08	TBD	0%
SLIM DE Brief to D&SWS Council	Dec 08	May 09	0%
SLIM Process Guide	Apr 08	Sep 09	5%
SLIM DE Deployed	Apr 08	Jan 12	2%





Questions Discussion



Other SLIM Interdependencies

- **SLIM needs GCSS-AF Data Services to increase data transparency and data access - Service Oriented Architecture**
- **SLIM needs LIMS-EV to provide enterprise R&M weapon system predictive trending, performance metrics, automated alerts, and reports**
- **SLIM needs AMT to provide accurate serially derived maintenance data**
- **SLIM needs D&SWS to provide Operational Risk Management (ORM) capabilities through the Active Risk Management (ARM) Pathfinder**



SLIM Process & Tool Survey Results

- **Final Report in work**
- **Best Practices**
 - **Health of the Fleet Reliability Council integrated with User Conferences such as PIWG, CPAB, and SSG**
 - **Program Office full-time Integrity & Reliability Team (or RAM Team)**
 - **C-5 Weapon System R&M Electronic Bulletin Board and F-15 CIP**
 - **Annual -6 Technical Order Review Conferences**
 - **LMDS and DRILS for bad actor identification and RTOK/CND analysis and trending**
 - **Reliability & Availability Assessment Modeling: JRAMS, C-17 MCROI/MCROE, AC-130U Assessment Tool, and ASC LCOM**
 - **Use of AFTOC Data**



SLIM Process & Tool Survey Results (cont)

■ Needs

- **Enterprise Tools:** FEMCA, RCMA, MIL-STD-882 Risk Assessment and Risk tracking/priorization, obsolescence & DMS trending/management, and Reliability & Availability Assessment Modeling
- **Weapon System Unique Tools:** prognostics and predictive algorithms
- **Data:** repair & inspection data from depots and back-shops, repair & inspection data from repair contracts, better access to R&M data, baseline system performance data from new and modification programs, IUID, repair tracking
- **Resources:** increased and stable SE, MSD Engineering, and CIP funding
 - More reliable systems and more proactive engineers
- **ECSS to accept RUL, SLA, and PoF inputs**
- **ECSS collect all required flight recorder, diagnostic, maintenance, usage, repair, inspection, and test data**
 - LMDS and DRILS for bad actor identification and RTOK/CND analysis and trending

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SLIM Training Program Development Schedule

■ Timeline:

- Two courses developed concurrently: Oct08-Jan09
- Two courses developed concurrently: Feb09-May09



**Funding
Required**

SLIM
WSIP

**Funding
Required**

RCM/MSG-3
CBM+

**Requires \$725K (FY
09)**

**Funding
Required**

RAM
AIP



SLIM Out-year Funding Requirements

- **A&AS Support - \$800K per year**

- **Enterprise Reliability Assessment Modeling Tool to help prioritize product improvement projects**
 - **FY09 AoA & comparison of existing non-enterprise tools**
 - **FY10+ Funding Required - TBD by second quarter FY09**

- **CBM+ Research Environment Deployment**
 - **Currently developing Transition Plan**
 - **FY 10+ Funding Required - TBD by first quarter FY09**



FY08 SLIM Unfunded Requirements

- **A&AS Support - \$800K**

- **CBM+ Research Environment (CBM+ RE) Deployment (formerly EPAE)**
 - \$2.15M for final phase of project prior to transitioning from AFRL

- **Collective Mind predictive R&M trending tool**
 - \$850K for final phase of project prior to transitioning to LIMS-EV



SCO-1-19 SLIM Metrics In-Work

- **Metric Name / Description: TBD**
 - # of SLIM training courses deployed and completed
 - # of deployed prognostics/trending/analysis models/tools
 - Compliance with SLIM & CBM+ A&S Toolkit Checklist
 - # automated feedbacks from analysis into sustainment processes
- **Baseline: TBD**
- **Performance Standards / Goals - TBD**
- **Reporting Method / Frequency - TBD**
- **Timeline - Original: 1 Jan 09, Current: 1 Jan 09**
- **Next Steps:**
 - Finalize the selection of measureable metrics and their baselines - 30 Sep 08

SLIM Data Environment

Data Collection: Flight Data Recorders/Forms/Manual Inputs into: ECSS and SLIM & CBM+ Services

